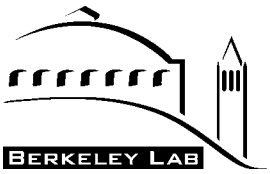

ENVIRONMENTAL ENERGY
TECHNOLOGIES DIVISION

IMPACT OF CARBON DIOXIDE ON HUMAN DECISION MAKING AND HEALTH

PURPOSE AND BACKGROUND

You are being asked to participate in a research study conducted by William J. Fisk M.S. and Mark J. Mendell, Ph.D. of Lawrence Berkeley National Laboratory, in collaboration with Professor Usha Satish, Ph.D at the State University of New York (SUNY) Upstate Medical University.

The goal of the study is to determine whether the concentrations of carbon dioxide in indoor air have subtle impacts on satisfaction with indoor air quality, health symptoms, and decision making performance. This study is funded by the SUNY Upstate Medical University and the United States Environmental Protection Agency

PROCEDURES

If you agree to participate in this study, the following will happen. You will initially spend approximately 30 minutes at Lawrence Berkeley National Laboratory to learn about the study including the computer simulation technique used for assessing decision making performance and to consent to participate. Subsequently, you will spend approximately 10 hours in a test room located at Lawrence Berkeley National Laboratory on one day. The day will include three sessions, each two and a half hours long. During the first 45 minutes of each study session, you will be free to study or read. During the remainder of each session, you will twice report your satisfaction with indoor air quality and intensity of health symptoms such as headache, eye irritation, and sleepiness, on a questionnaire that takes about five minutes to complete. You will also watch a 20 minute video with instructions in taking the computer simulation test of decision making performance and then take the 60-minute test. During the first session, you will also be asked via a questionnaire, about your medical history, age, gender, and education level. The total time required for participation in this study, excluding your transport to and from the study site, will be approximately 10 ½ hours.

The concentrations of carbon dioxide in the air within this test room will be artificially manipulated so that it varies between the study sessions; however, you will not be informed of the carbon dioxide concentrations experienced in specific sessions. Carbon dioxide is a gas present in all air, but indoor carbon dioxide concentrations are higher that outdoor carbon dioxide concentrations because people are a source of carbon dioxide. In this study, carbon dioxide concentrations will be maintained below approximately 2500 parts per million (e.g., 2500 molecules of carbon dioxide for every 1,000,000 molecules of air), a level which is frequently experienced or exceeded in crowded or poorly ventilated indoor spaces, including some classrooms. Adverse health impacts from carbon dioxide have only been documented at much higher concentrations. Carbon dioxide at concentrations greater than 20,000 parts per million cause a deepened breathing, at 40,000 parts per million breathing rates are increased markedly, at 100,000 parts per million visual disturbances, tremors (unsteady hands), and loss of consciousness have been reported, and 250,000 parts per million can cause death. Two small prior studies have found evidence that people's satisfaction with indoor air quality and performance of simulated office work tasks have been slightly degraded with indoor carbon dioxide concentrations of 5000 or 2500 parts per million relative to concentrations of 600 parts per million.

RISKS/DISCOMFORTS

The addition of carbon dioxide to the chamber air during some sessions may cause you to be less satisfied with indoor air quality or to perform slightly less well in the tests of decision making performance. You may also have more frequent or more intense irritation of eyes and nose, headache, fatigue, sleepiness, cough, tight chest, or difficulty breathing when carbon dioxide concentrations are higher. Any such effects, if they occur, are expected to be mild, temporary, and typical of people's experiences in crowded and/or poorly ventilated rooms that also have elevated levels of carbon dioxide. The challenge to which you respond in the simulation test of decision making performance will not be greatly different from those which people experience frequently at their jobs. You may at times feel that you are doing your assigned task well and at other times that you are not doing as well as you would want to.

As with all research projects, there is a small chance that the confidentiality of the information collected could be compromised, but we will take care to prevent this from happening. Your study records will be kept confidential to the extent permitted by law. Your name, telephone number, and email address will not be included in any files with the results of questionnaire or simulation test data or in any report or publication resulting from this research. We will not publish any other information that could be used to uniquely identify you. All researchers with access to the data you provide will receive training in the proper handling of confidential data.

COMPENSATION FOR INJURY

If you are injured as a result of taking part in this study, medical care and treatment will be available to you as a participating subject. The costs of this care may be covered by the University of California depending on a number of factors. If you have any questions regarding this assurance, you may consult or call the Berkeley Lab Human Subjects Committee, MS 26RO143, 1 Cyclotron Road, Berkeley, CA 94720-8239 (510-486-5399).

BENEFITS

Participating in the study will not directly benefit you. The results of this study could; however, prompt future designers and operators of buildings to provide more outdoor air ventilation to buildings. If this happens, satisfaction with indoor air quality, health, and work performance might be improved.

STORAGE OF DATA

Your responses to the questionnaires and to the simulation test of decision making performance will be stored in electronic data files available only to trained study staff. Your name or other personal identifiers (e.g., telephone numbers) will not be included within these files.

FINANCIAL CONSIDERATIONS

The study will be of no cost to you except you will bear any cost of transportation to and from the study site at Lawrence Berkeley National Laboratory. We will provide you $40 per session compensation plus an additional $40 if you complete all three study sessions, for a total of $160 for completing all sessions. The payment will be in the form of a check provided within four weeks after your final study session. This payment is taxable income and you are responsible for declaring this income and paying any associated taxes.

ELIGIBILITY

To be eligible for participation in this study"

- you must be at least 18 years old
- you must be available to participate during at least three study sessions
- you must be able to transport yourself to the study site (accessible by car plus a short walk or by taking a shuttle bus plus a short walk)
- you must be proficient in use of a personal computer
- you must not be pregnant or a nursing mother; however, we will not require a pregnancy test
- you must not require a wheel chair (the room where studies will take place is not wheel chair accessible)
- you must not have any disability in vision, hearing, or movement that significantly inhibits your ability to receive training via a video or to complete a 1.5 hour computerized test
- you must not be an employee of Lawrence Berkeley National Laboratory, but you can be a U.C. student working on-site at LBNL if not paid by LBNL

QUESTIONS

Any further questions you have about taking part in this study will be answered by William Fisk at (510) 486-5910 wjfisk@lbl.gov or Mark Mendell at (510) 486-5762. Professor Usha Satish can be contacted at (315) 464-3114 about the testing of performance in decision making.

PARTICIPATION IN RESEARCH IS VOLUNTARY.

You have a right to not take part in this study or to stop taking part at any time. Your decision about whether or not to participate will not affect your relationship with Lawrence Berkeley National Laboratory. You will be given a copy of this consent form and the Experimental Subjects' Bill of Rights to keep. If you wish to participate you should sign below.

Please note that even if you have consented to participate we may not choose you as a participant because of scheduling constraints.

AUTHORIZATION

I have read this consent form. I meet all of the eligibility criteria listed above. All of the questions I asked have been answered to my satisfaction. I volunteer to participate in this research.

Date	Subject's Signature
	Subject's Name (print legibly)
Date	Person Obtaining Consent (Signature)
	Name (print legibly)